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FORMATION OF POLYCRYSTALLINE SILICON THIN FILM

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ABSTRACT:

PURPOSE:To make it possible to manufacture a polycrystalline Si MOS type field-effect transistor characterized by a small OFF current, a small absolute value of threshold voltage and a large operating current, by using disilane or trisilane as a reacting gas, performing deposition in an amorphous state at a specified temperature, performing a heat treatment and polycrystallization.

CONSTITUTION:Decomposition is performed at a temperature of 550.degree.C or less by using **disilane** or **trisilane** as a reacting gas, and deposition is performed under an amorphous state. Heat treatment is performed at a temperature higher than the deposition temperature, and a polycrystalline state is obtained. For example, an amorphous Si film 13 is deposited on an SiO.sub.2 film 12 on a P-type Si substrate 11 by an **LPCVD** method by using Si.sub.2H.sub.6 gas as a reacting gas at a temperature of 520.degree.C. The film is patterned in an island shape. Thereafter, an SiO.sub.2 film 14 is deposited. Heat treatment is performed at 900.degree.C, and a gate oxide film is obtained. Then, P ions are implanted in the polycrystalline Si 13. A polycrystalline Si film is deposited by using SiH.sub.4 as a reacting gas, and a gate electrode 15 is formed. Then, an SiO.sub.2 film is formed by heat treatment. BF.sub.2 ions are implanted, and P-type high concentration impurity regions for a source, a drain and a gate are formed.
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